

TANK and MEDIUM CALIBER ARMAMENT SYSTEMS – TMAS

Presented to
NDIA

“Armaments for the Army Transformation”



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AGENDA

- ◆ **MISSION**
- ◆ **TMAS ORGANIZATION**
- ◆ **TRANSFORMATION**
- ◆ **LEGACY**
- ◆ **BCT**
- ◆ **FCS**
- ◆ **UPCOMING EVENTS**

TANK & MEDIUM-CALIBER ARMAMENT SYSTEMS MISSION

**Provide the Army and the Department of Defense
With World Class Direct Fire Main Armaments for
Use in Ground Combat Weapons Platforms**



Medium-caliber Ammunition

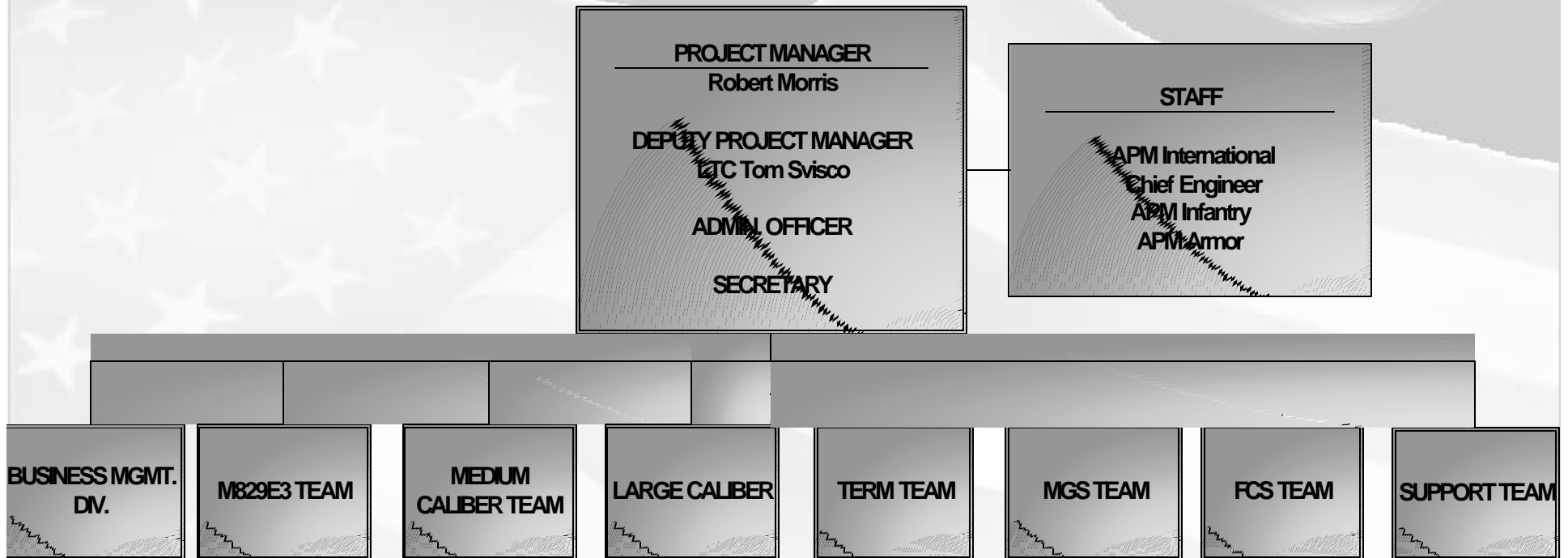


Large Caliber Ammunition

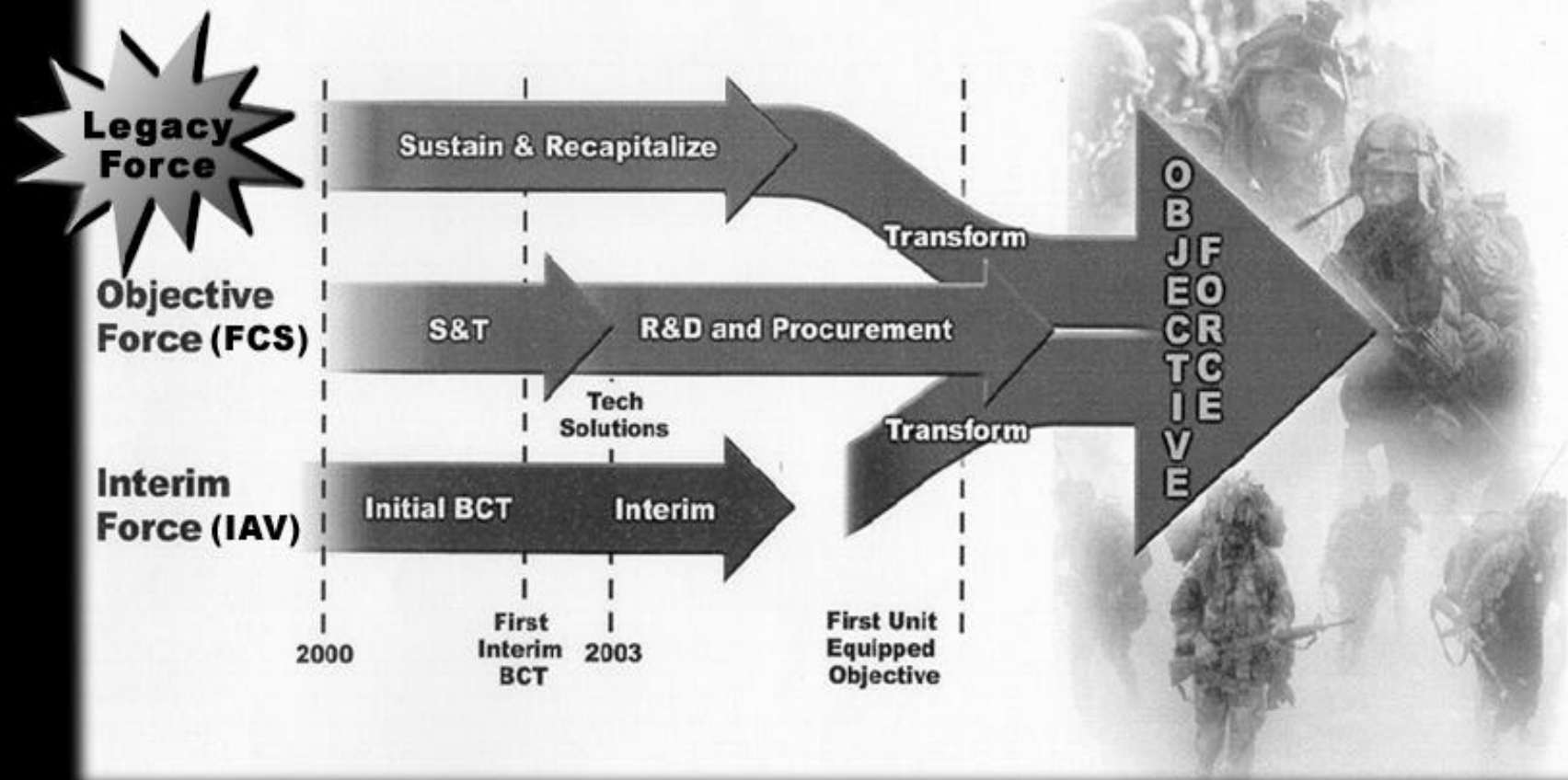
**Perform Life Cycle Management to Include Development,
Production, Fielding, Testing and Environmental Impacts
As Well As Portions of Target Acquisition and Recognition
and Fire Control**

**Platforms Include – Abrams Tank, Bradley Fighting Vehicles,
Mobile Gun System and Future Combat System**

PM TMAS ORGANIZATION



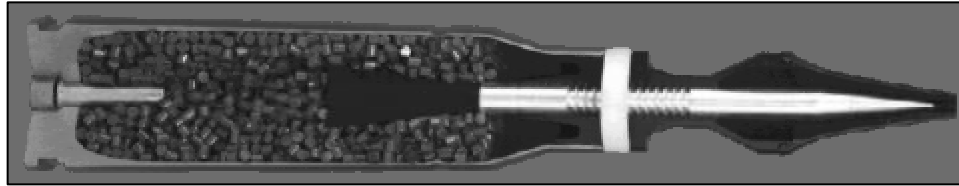
PM Tank and Medium-Caliber Armament Systems **Delivering Affordable Lethality for Combat Platforms**



PM TMA is Decisively Engaged on all Three Routes to the Objective Force

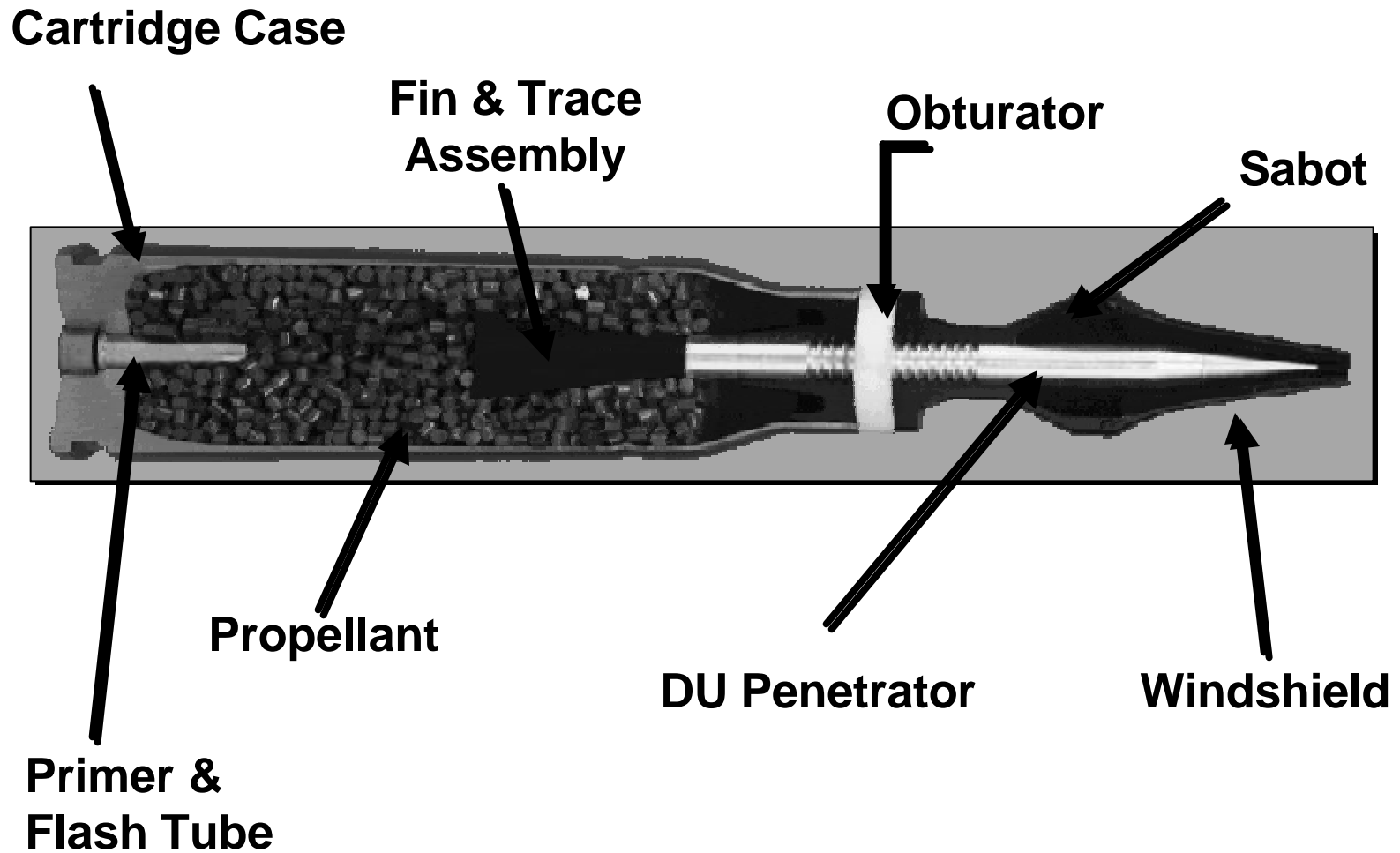
- Legacy Force: Improved Lethality for Abrams and Bradley***
- Objective Force: Multi-Role Armament and Ammunition Suite***
- BCT: MGS Ammunition***

M919 APFSDS-T CARTRIDGE



- ◆ 25mm DU Kinetic Energy Round
- ◆ Designed for Bradley M242 Gun
- ◆ Capable Against Modern Fielded Targets (BMP's)
- ◆ Performance Spec.
- ◆ FY01 Contract w/GD-OTS for 208.8K Cartridges Signed Nov 00
 - Delivery Schedule Jul 01 – Mar 02
- ◆ FY01 Congressional Plus Up, Contract Award – Mar 01, 75K Units
 - Delivery Schedule Apr 02 – Jun 02
- ◆ FY02 GDOTS Projectile Manufacturer to be Moved From Downey CA to Red Lion, PA – Mar 02

M919 COMPONENTS



M910E1 TP-T DEVELOPMENT EFFORT

<u>Requirement:</u>	Ballistically Similar M919, Effective Range to 2500m Similar Trace to M919
<u>Current Practice:</u>	Train w/M910 (Designed to Match M791) Possible Negative Training <ul style="list-style-type: none">◆ 2000m Limit◆ Mismatches:<ul style="list-style-type: none">–Time of Flight–Trajectory (Slow Lob)–Tracer

CTAI 40MM GUN TESTING

Why Needed:

- ◆ Possible Application in Numerous Army Platforms (e.g BCT, IAV, Bradley Up-gun)

Plan:

- ◆ PM-TMAS to Sponsor Gun Test @ APG
 - US Collects Data @ TECOM Test Range
 - CTAI Pays Bill
 - PM FSCS Concurs – SIKA & LANCER Plan to Include 40mm CTAI Gun on Demonstrators

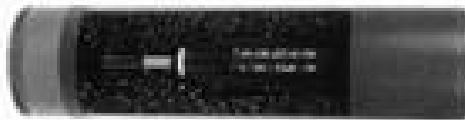
When:

- ◆ TMAS & DTC Met w/CTAI 22, 23 Jan 01
- ◆ Signed Test Agreement – Jun 01
- ◆ Test to Start ~ Sep 01

40mm CT-2000

40mm CTWS Remote Weapon Station Concept

A highly reliable, lighter weapon platform that offers many integration advantages and increased survivability.



Armor Piercing Fin Stabilized Discarding Sabot (APFSDS-T)



General Purpose Round-Traced (GPR-T)

Medium Caliber Armament Study

Purpose: To Broaden
The Database on Medium
Caliber Armament Systems
In Order to Ensure that the
Bradley IFV, the IAV, and
The FCS are Lethal Against
Modern Threat Targets



Bushmaster III



Bushmaster II



M242



40mm CTWS Cannon



LARGE CALIBER SYSTEMS

120MM



M829
APFSDS-T



M829A1
APFSDS-T



KE-W



M830
HEAT-MP-T

← **OUT OF
PRODUCTION** →



M829A2
APFSDS-T



KE-WA1



M830A1
HEAT-MP-T

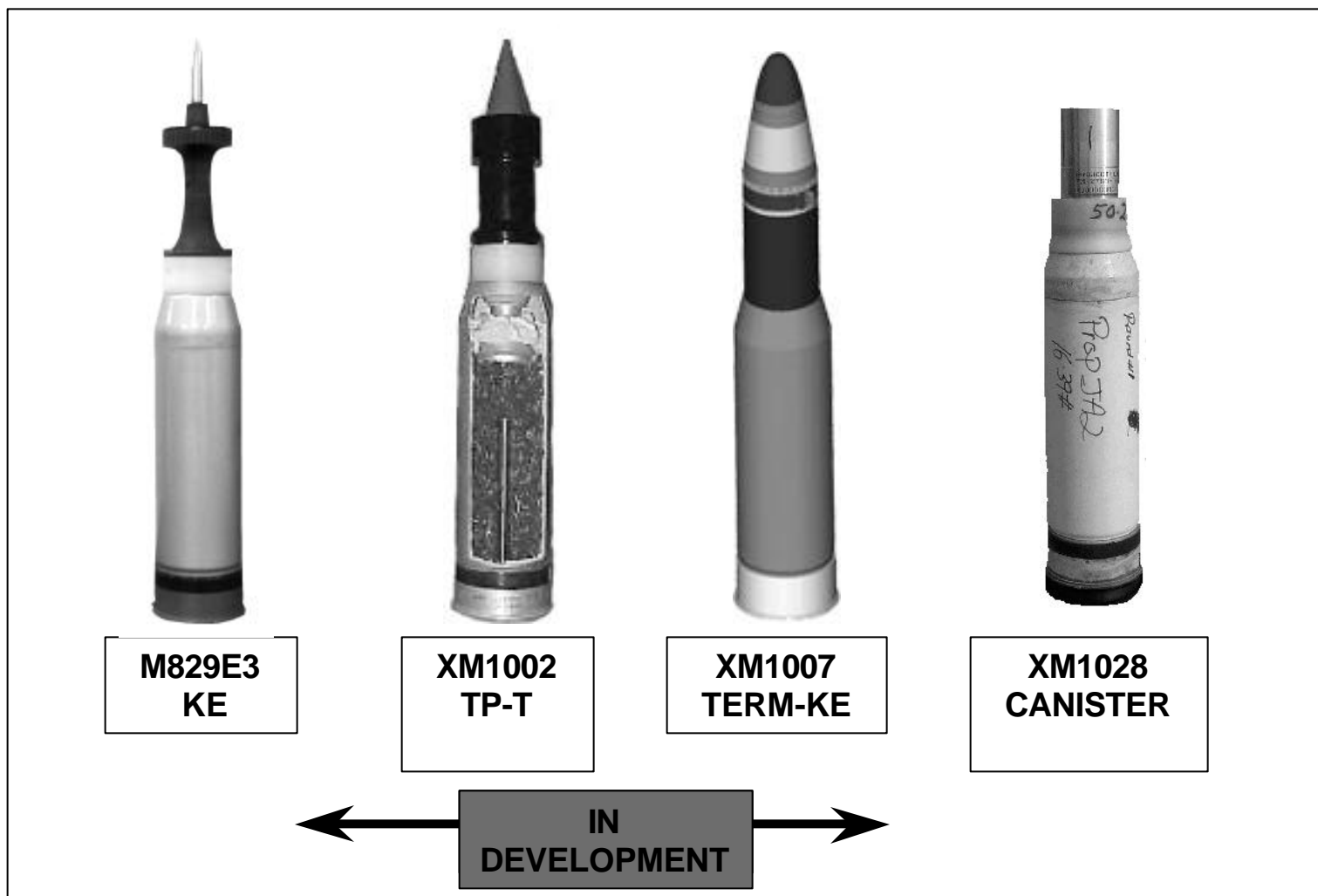


XM908
HE-OR-T

← **IN
PRODUCTION** →

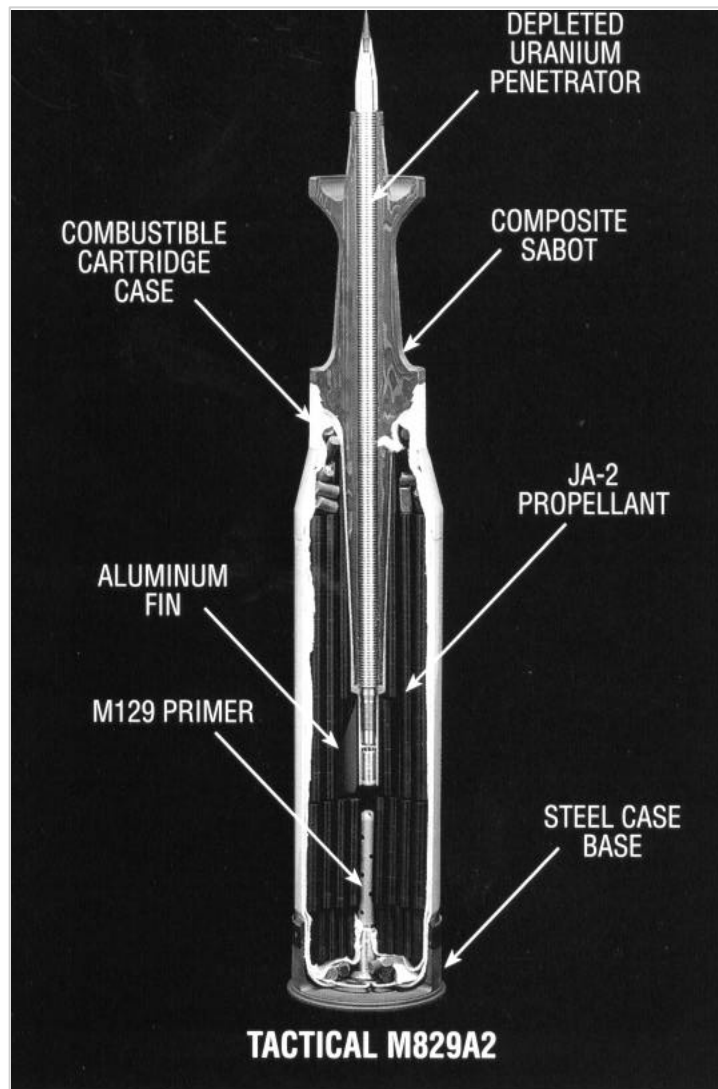
LARGE CALIBER SYSTEMS

120MM



M829A2

APFSDS-T CARTRIDGE



- ◆ **Third Generation 120mm Kinetic Energy Ctg**
- ◆ **Increased Lethality:**
 - “Super DU” Penetrator
 - Composite Sabot
 - High Density Propulsion System
- ◆ **Cartridge Characteristics:**

Length	984mm
Weight	20.8kg
Propellant Type	JA2
Stick	
Propellant Weight	8.7kg
Projectile Weight	7.9kg
Velocity	1680 m/s

M829A2 SCHEDULE



- ◆ TC-STD: Sep 92
- ◆ Systems Contractor: GD-OTS (Previously PRiMEX)
- ◆ Production: FY92-FY00
- ◆ Last Cartridge Delivery: Jun 01
- ◆ AAO Quantity: 139,890
 - Inventory After FY00 Contractual Deliveries: 136,600

M830A1 CARTRIDGE CHARACTERISTICS



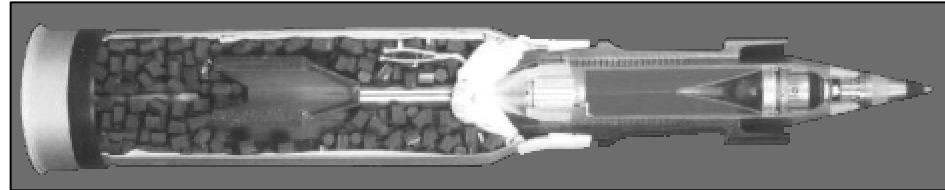
◆ Multi-Purpose (Increased Ph)

- Light Armor Vehicles
- Heavy Armor (Side/Rear)
- Buildings & Bunkers
- Anti-Helicopter
- Anti-Personnel

◆ Cartridge Characteristics

- | | |
|---------------------|------------------|
| • Length | 984mm |
| • Weight | 22.8 Kg |
| • Propellant Type | JA-2 19 Perf HEX |
| • Propellant Weight | 7.4 Kg |
| • Projectile Weight | 11.1 Kg |
| • Fuze | M774, P1BD |
| • Velocity | 1410 m/s |

M830A1 (MPAT)

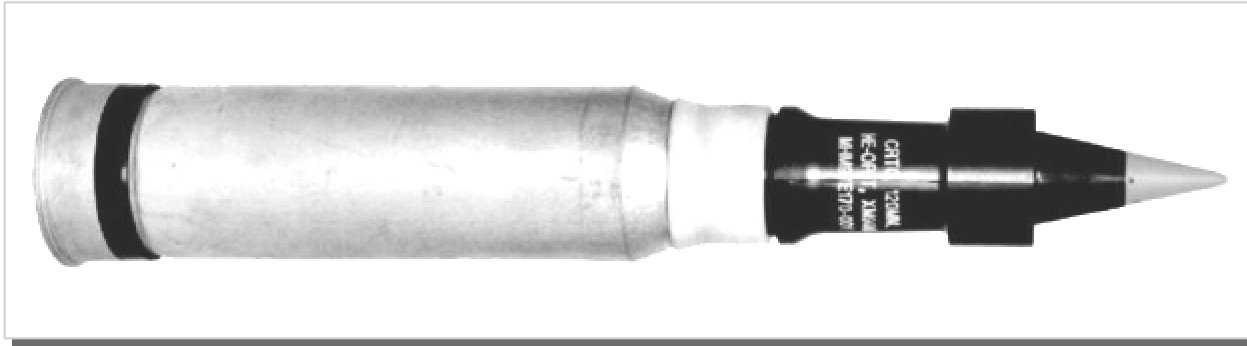


- ➔ Approved for Export Aug 99
- ➔ Potential FMS Sales-Netherlands, Switzerland & Egypt?
- ➔ FY00 Contract Awarded May 00
- ➔ Deliverable Quantity Remaining 2,451 Dec 01

**Production Program
Systems Contractor - Alliant**



XM908 HE-OR-T



- ◆ Inventory
 - 11,000 in Korea
 - 5,500 in Route to Korea
- ◆ 20,836 Revised Requirement
- ◆ FY00
 - 3,100 Option Award Anticipated by Aug 01

Provide Sufficient Rubbling of Concrete Obstacles to Allow an M1A1 and M1A2 Blade Equipped Vehicle to Clear Maneuver Lanes

2ID PERFORMANCE DEMONSTRATION



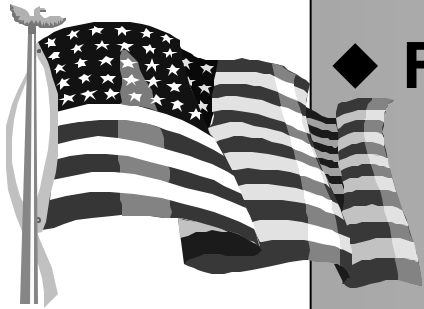
Simulated passage with rock drop

OBSTACLE REDUCED BY XM908



KE-WA1

EGYPTIAN TANK AMMO



- ◆ Tungsten KE Based on DM43A1
- ◆ FMS to Egypt
 - Qualification – Complete
 - 10K Production for Egypt – Complete
 - Lot Acceptance Testing – Underway
 - Logistics Support
 - ABRAMS Integration
 - Possible Follow-on Production of 5000



**Possible Follow-on KE-WA2
Qualification & Production**

M829E3

CARTRIDGE DESCRIPTION

More Lethal

More Accurate

Expands Battle Space

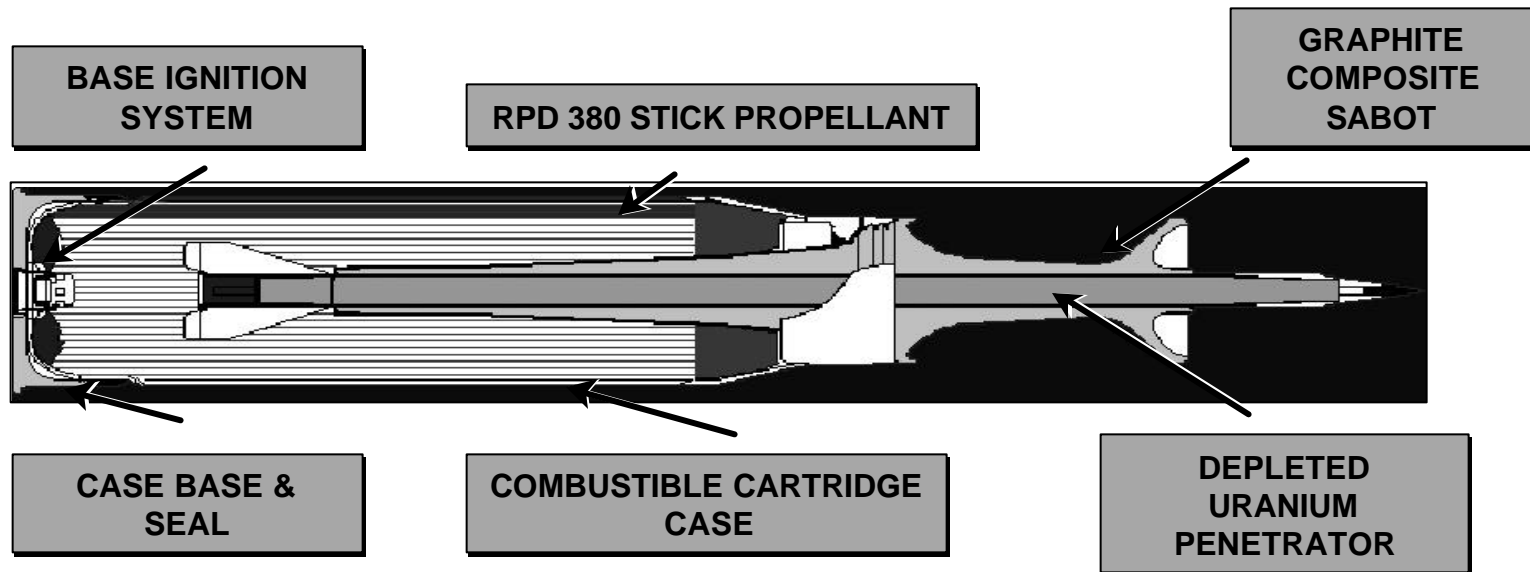
Expanded Temp Range

Improved IM Performance

Improved Durability

Corrosion Resistant

Low Cost



M829E3 SCHEDULE

EMD & 3 Production Options (LRP, PY1 & PY2)



- | | |
|---------------------------|---------------------|
| ◆ System Contractor – | Alliant Techsystems |
| ◆ LRP IPR - | Oct 01 |
| ◆ Planned LRP Proc.- | 4-5K Cartridges |
| ◆ TC-STD - | Oct 02 |
| ◆ Planned PY1 Proc. - | 8-10K Cartridges |
| ◆ Planned PY2 Proc. - | 8-10K Cartridges |
| ◆ Material Release - | Jul 03 |
| ◆ Planned PY3-PY6 Proc. – | 40-45K Cartridges |

XM1002 TRAINING CARTRIDGE FOR THE M830A1 MULTI-PURPOSE, ANTI-TANK (MPAT)



- ◆ **Looks & Feels Like M830A1:**
 - Simulate Loading & Handling
- ◆ **Similar Ballistics to 3km:**
 - Ground Target Simulation
- ◆ **Tracer Visible to 4km:**
 - Distinct Color vs. KE Trainer
 - Air Target Simulation
- ◆ **Dummy Air/Ground Switch:**
 - Loader Familiarization
- ◆ **Max Range < 8km**
- ◆ **Min Tube Life: 1500 Rds**

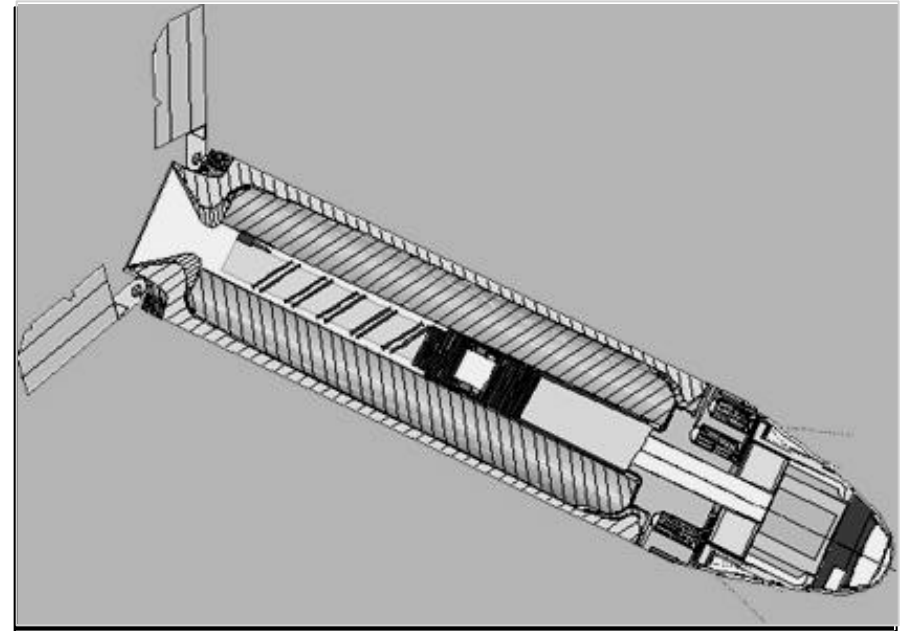
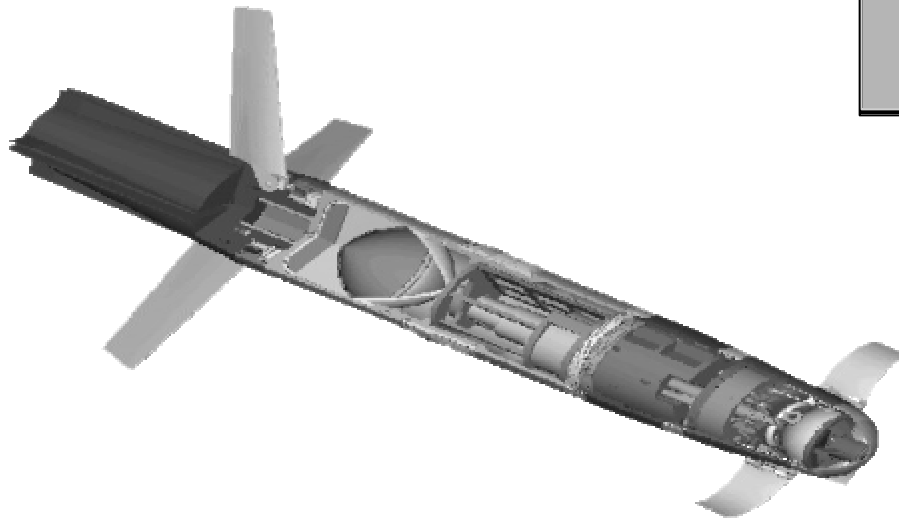
XM1002 PROGRAM SCHEDULE

- ◆ **Complete Design Iteration 1 Ballistic Tests**
 - **Down Select to Best Two Configurations**
- ◆ **Mod Contract for Obturator Material Change Evaluation**
 - **Introduce in Design Iteration 2**
- ◆ **Plan & Schedule Design Iteration 2 Ballistic Tests**
 - **Down Selection to Final Configuration**
 - **Introduce Zytel 42A New Obturator Material**
 - **Cartridge Robustness**
 - **TID @ H, C & A**
- ◆ **Plan Final Design Iteration Ballistic Tests**

TERM SCIENCE AND TECHNOLOGY

Raytheon / GD-OTS

- ◆ Shaped Charge (CE) Warhead
- ◆ Tri-mode Seeker
 - Semi-Active Laser (SAL)
 - Millimeter Wave (MMW)
 - Imaging Infrared (I²R)



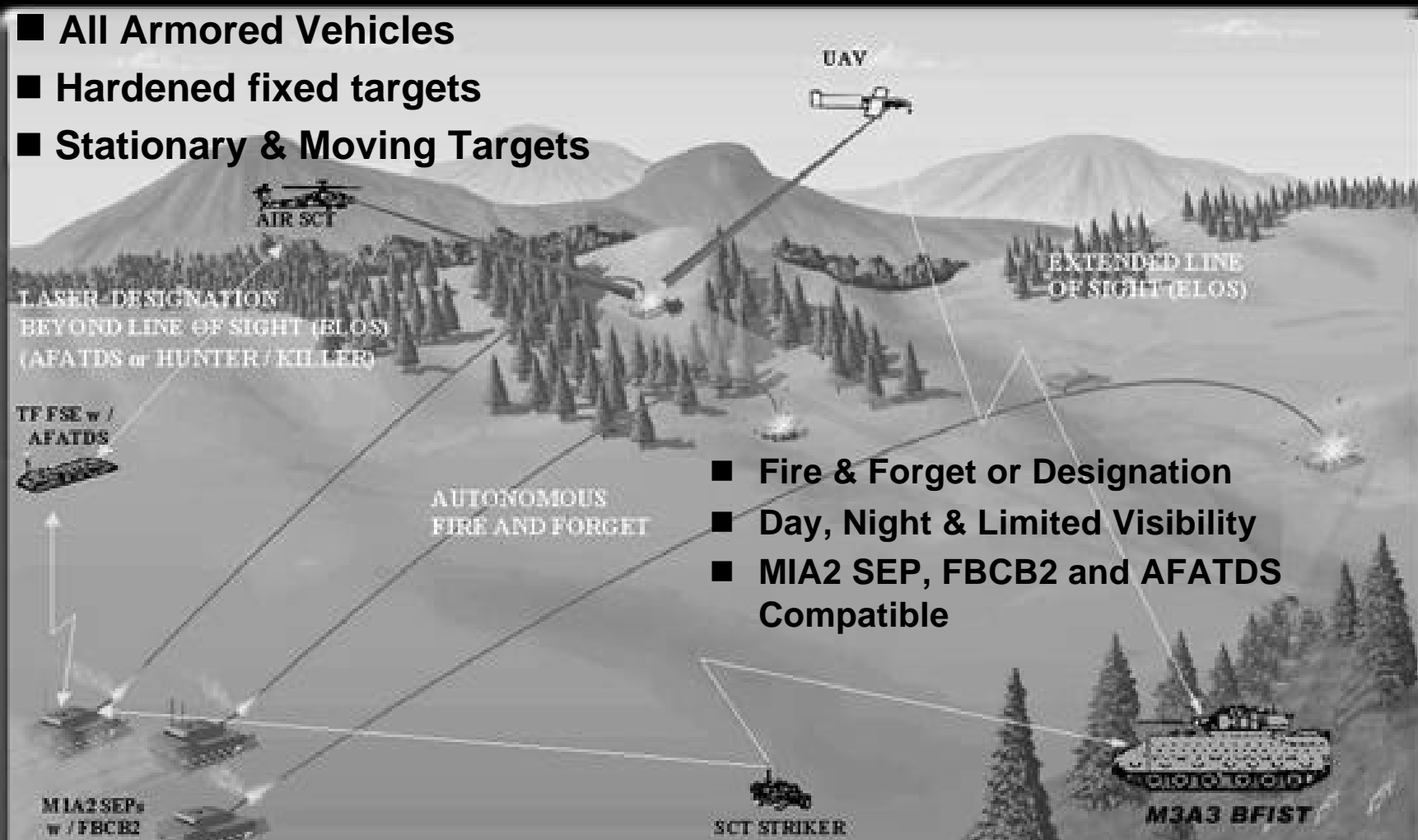
Alliant Techsystems

- ◆ KE Penetrator
- ◆ Rocket Boost
- ◆ Dual Mode Seeker
 - Semi-Active Laser (SAL)
 - Millimeter Wave (MMW)

Tank Extended Range Munition (TERM)

Concept of Employment

- All Armored Vehicles
- Hardened fixed targets
- Stationary & Moving Targets



- Fire & Forget or Designation
- Day, Night & Limited Visibility
- MIA2 SEP, FBCB2 and AFATDS Compatible

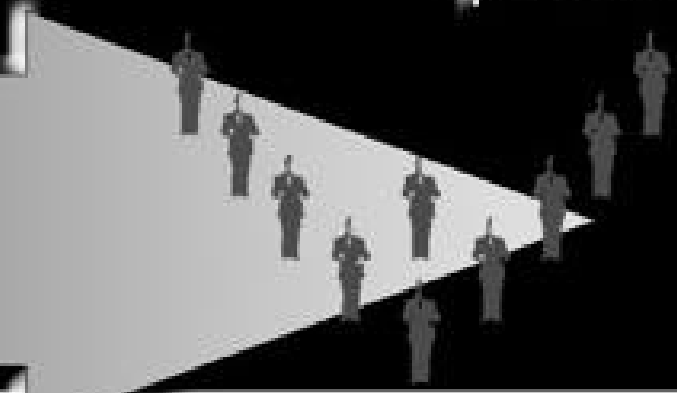
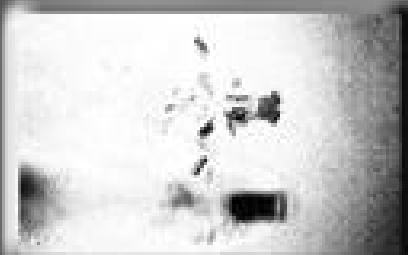
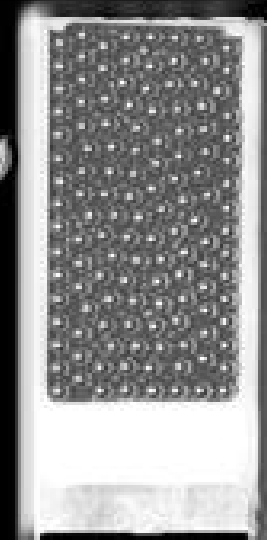
TERM Provides Precision Lethality With Extended Range Line-of-Sight and Beyond-Line-of-Sight Fires to the Armored Forces

120mm CANISTER XM1028



*Defeat >50% Advancing Squad w/1 Shot
*Defeat >50% Advancing Platoon w/2 Shots
*200-500M (Threshold) | 100-700M (Objective)
*Muzzle Action

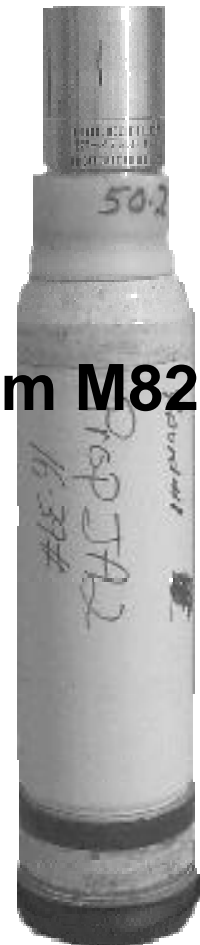
**CARTRIDGE, 120MM,
CANISTER, XM1028**



XM1028

CHARACTERISTICS

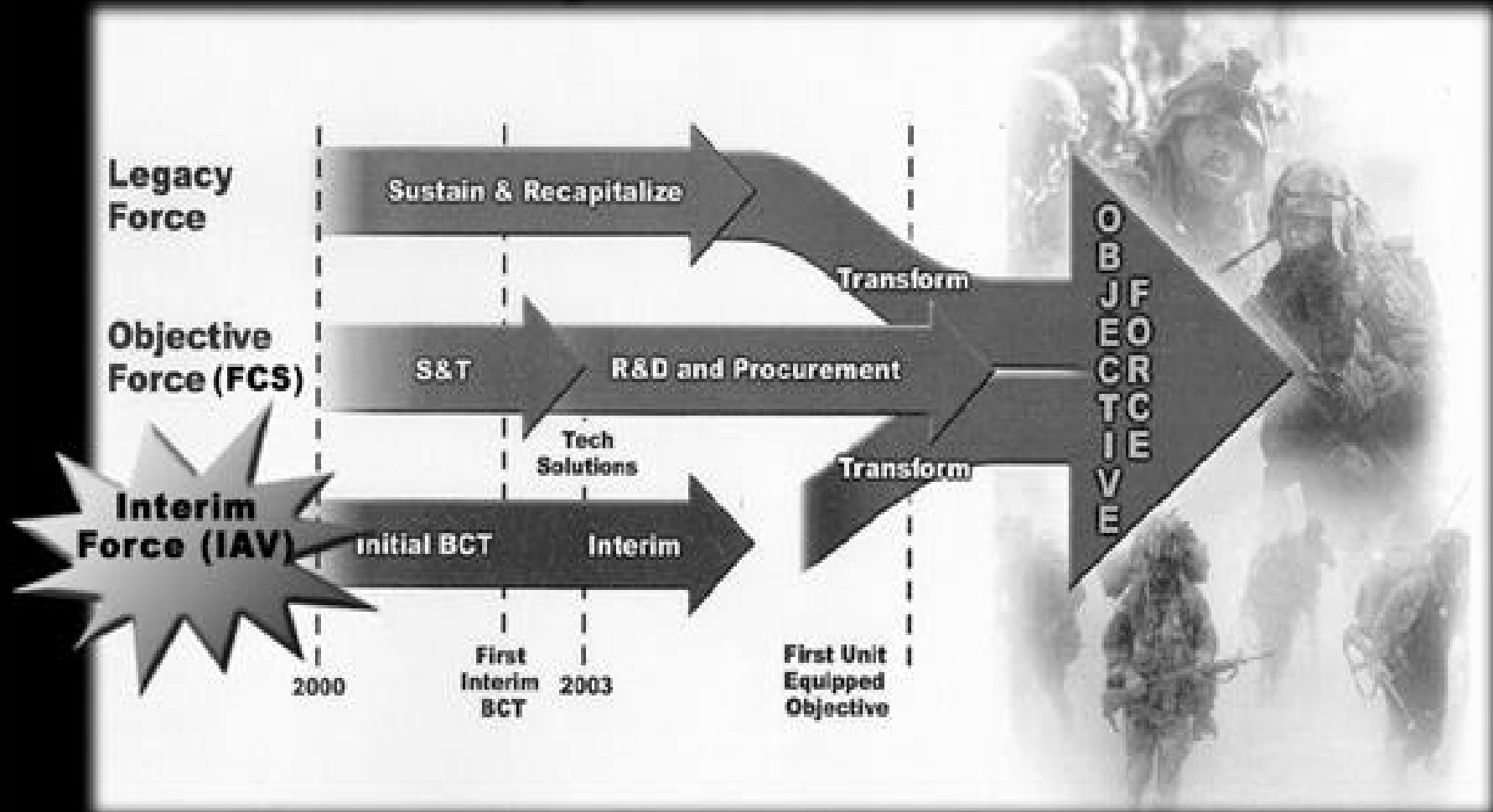
- ◆ **Aluminum Projectile**
- ◆ **1150 3/8" Tungsten Balls**
- ◆ **Propellant**
 - **JA-2 Used in Early Tests**
 - **Requested Salvage Propellant From M829 De-Mil Program**
- ◆ **Standard Propulsion System**
 - **Combustible Cartridge Case (CCC)**
 - **M125 "Cool" Primer**
 - **Case Base & Seal Assembly**
- ◆ **Crtg. Wgt ~ 51 Lbs.**



XM1028 SCHEDULE

- ◆ **Approved for FY02 WRAP Funding**
- ◆ **Competitive Solicitation (Development)**
 - **US/Canada**
 - **Performance Specification**
 - **Gov't Design/Test Data Provided for Info**
 - **Best Value Award (Jan 02)**
 - **9 Month Optimization Phase**
 - **9 Month Qualification Phase**
- ◆ **Production Options (USFK)**
 - **LRP Qty – 2K (FY03)**
 - **Full Rate Production**
 - **8K – FY04**
 - **6K – FY05**
 - **Additional Qty (20K) for Other Theaters Possible**

PM Tank and Medium-Caliber Armament Systems **Delivering Affordable Lethality for Combat Platforms**



PM TMA is Decisively Engaged on all Three Routes to the Objective Force

- Legacy Force: Improved Lethality for Abrams and Bradley***
- Objective Force: Multi-Role Armament and Ammunition Suite***
- BCT: MGS Ammunition***

LARGE CALIBER SYSTEMS

105MM



M900
105mm
APFSDS-T

**OUT OF
PRODUCTION**



M833



Canister



HE

**PROJECTED
REQUIREMENT**

MOBILE GUN SYSTEM

Current GDLS Configuration



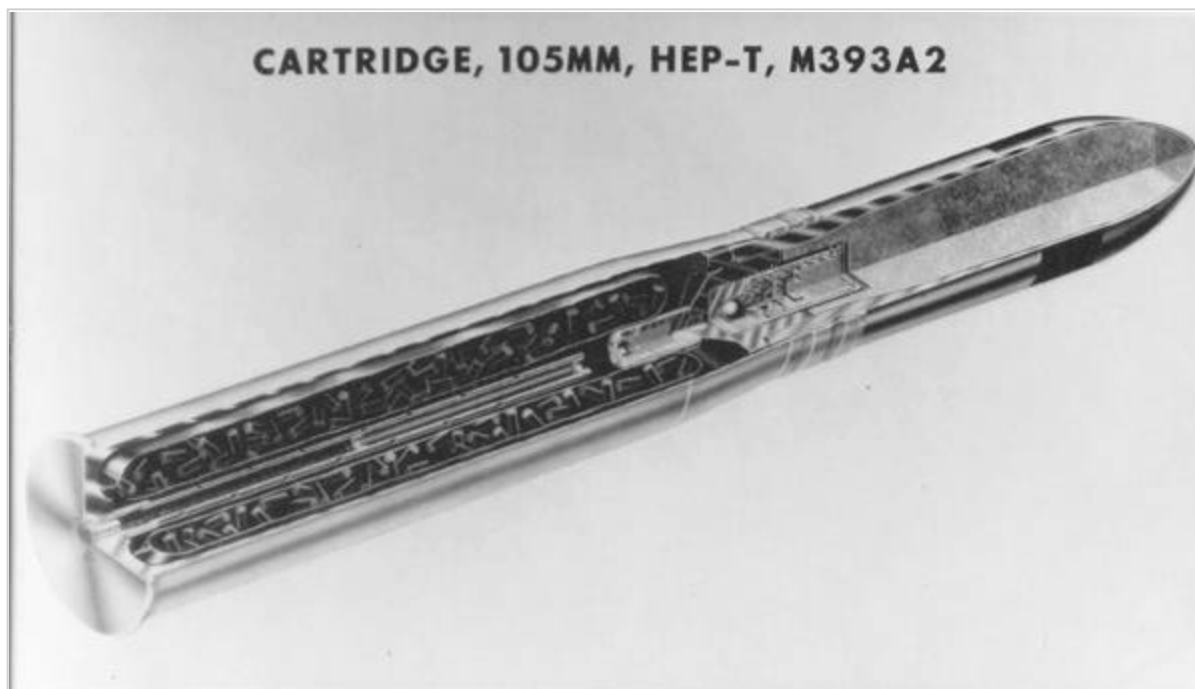
- ◆ 105mm Modified M68A1E4, to include Pepper-pot MB, Abrams MRS, Thermal Shroud, & Bore Evacuator
- ◆ Autoloader with 8rd Carousel, 10 Rd replenisher
- ◆ Compact Modular Sight (used on AAV)
- ◆ Capitalizes on use of existing stockpile

- ◆ MGS Primary Armament Shall Defeat Std Infantry Bunker and Create Opening in Double Reinforced Concrete Wall, With Minimum Number of Rounds, Through Which Infantry Can Pass
- ◆ MGS Primary Armament Shall Be Able to Defeat Infantry Squad From 50m (Min) to 700m

105 AMMUNITION STOCKPILE INVENTORY

NOMENCLATURE	QUANTITIES
M494 APERS	1,600
M393A1 TP-T (HEP)	6,862
M467 TP-T (HEP)	8,288
M393A2 HEP-T	52,557
M900 APFSDS-T	105,846
M456A1/A2 HEAT-T	152,046
M490A1 TP-T (HEAT)	342,883
M724A1 TPDS-T (KE)	364,639

MGS ARMAMENT REQUIREMENTS

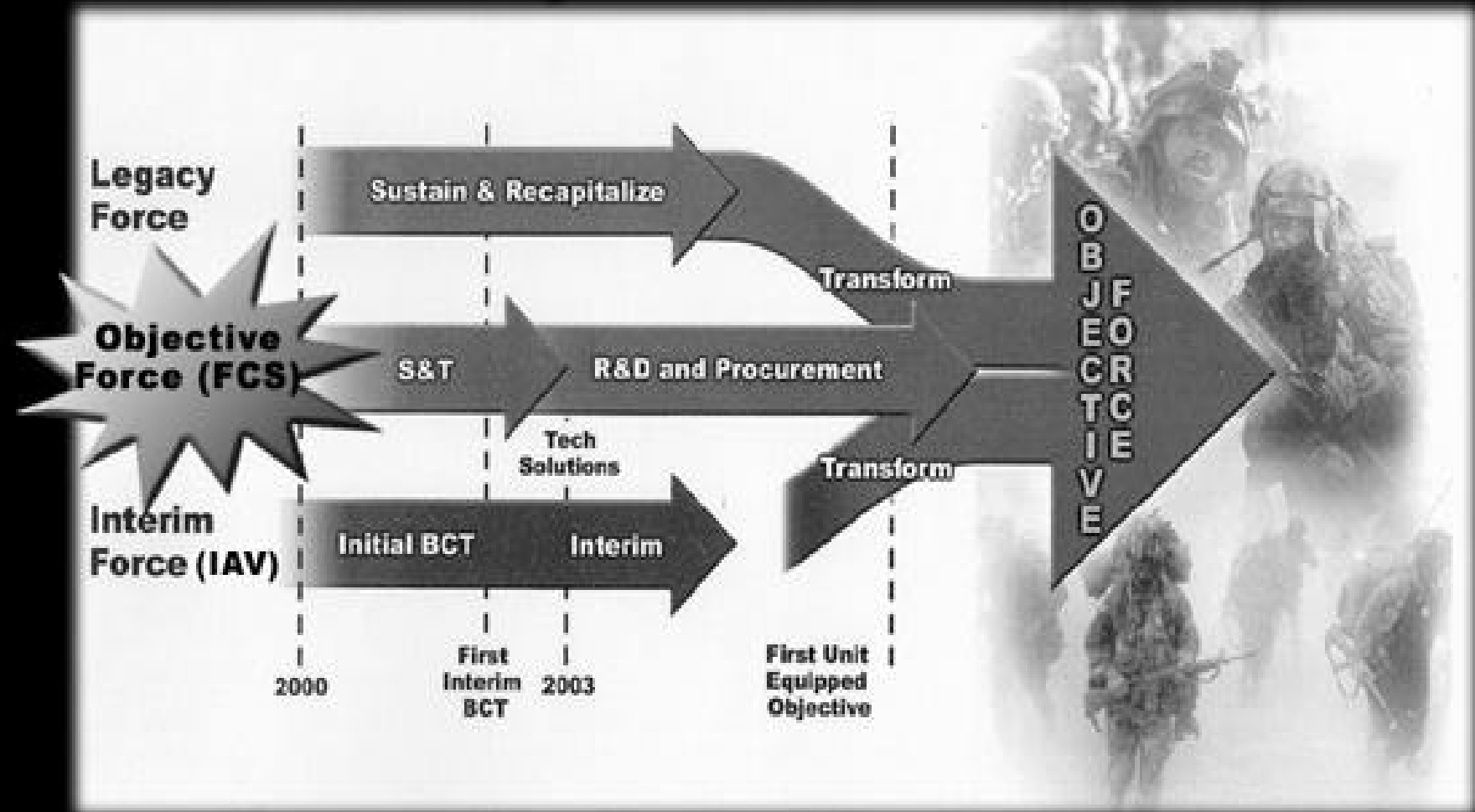


- ◆ 25 Years Old on Average
- ◆ Cartridge Designed in Early 60's and Would Not Meet Current Safety Standards
- ◆ Designed for a 20 Year Shelf Life
- ◆ OSC Surveillance Tests Have Shown Some Higher Dispersion and More Primer Corrosion Throughout Remaining Stockpile

PM-TMAS PLANS

- ◆ **Obtain Stockpile Performance Data Against Double Reinforced Concrete Wall Tests**
 - **Determine Utility ASAP**
 - **Testing Planned in ARL – Jun 01**
- ◆ **Inspect, Teardown & Visually Inspect M393A2 Stockpile (Predictive Surveillance)**
 - **Determine Condition of Critical Components (Fuze, Primer)**
 - **Gain Insight to Extent of Degradation**
- ◆ **Procure, Test & Evaluate “Samples” of Several HE & HE Training Cartridges for Future Procurement That Would Dovetail With Critical MGS Tests - Determine Options Now - Reduce Integration Test Costs**

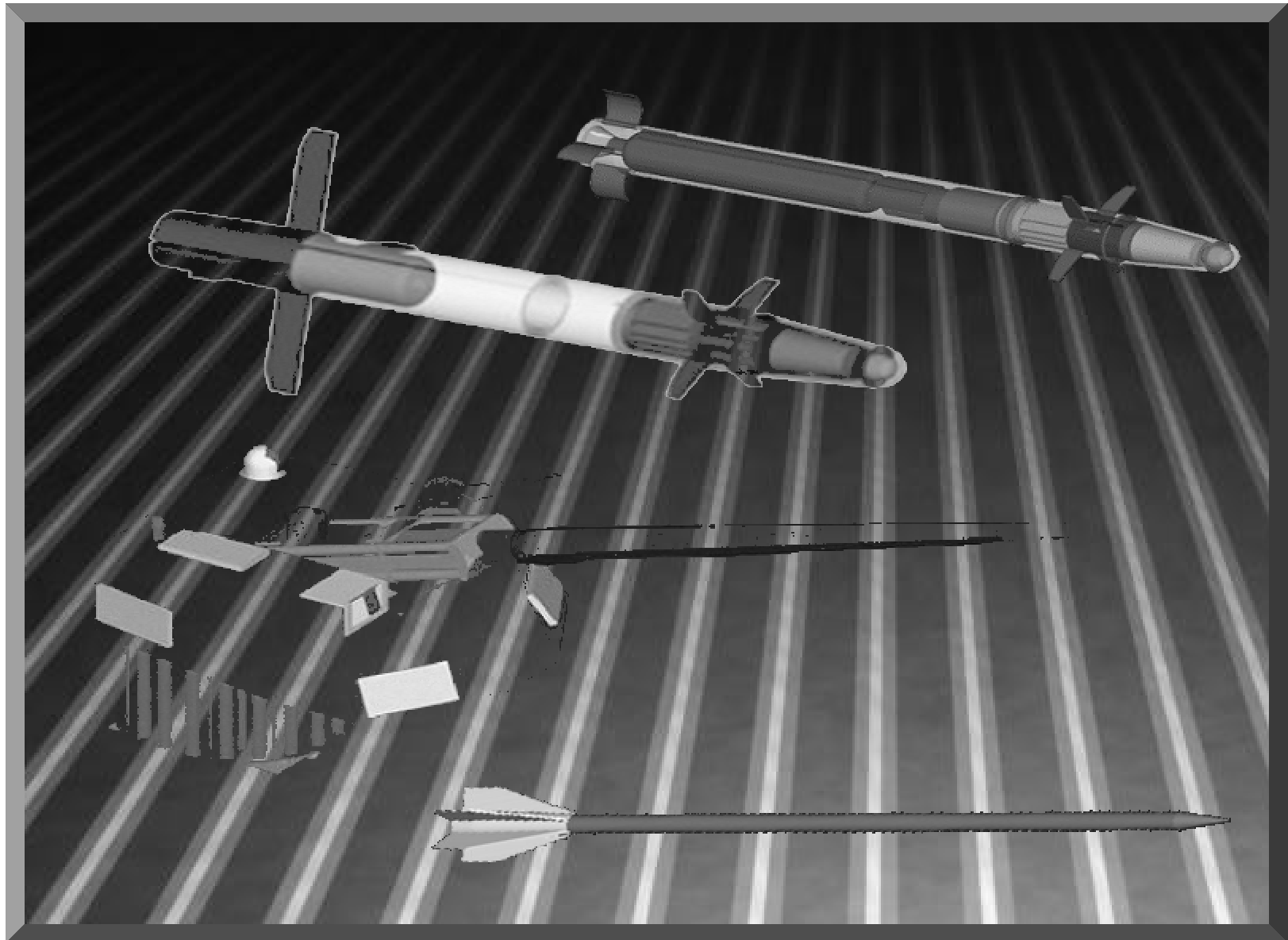
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FCS MULTI-ROLE ARMAMENT & AMMUNITION SYSTEM (MRAAS)



UPCOMING ACTIVITIES

FY02/03

- ◆ 120mm XM1028 CANISTER (WRAP)
- ◆ 120mm TERM
- ◆ 120mm M829E3 PRODUCTION
- ◆ 25mm M919 PRODUCTION
- ◆ 105mm AMMO for MGS
 - CANISTER
 - HE-T
 - TP-T